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TECHNOLOGY TRANSFER AS APPLIED TO CHIEF RADIOMEN IN THE U. S. NAVY AND COMPARED TO NAVAL OFFICERS OF THE CIVIL ENGINEERING CORPS

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THESIS

TECHNOLOGY TRANSFER AS APPLIED TO CHIEF RADIOMEN IN THE U.S. NAVY AND COMPARED TO NAVAL OFFICERS OF THE CIVIL ENGINEERING CORPS

by

Charles R. Fontz

Michael P. Shoemaker

March 1975

Thesis Advisor: J. W. Creighton

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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* TECHNOLOGY TRANSFER AS APPLIED TO CHIEF RADIOMEN IN THE U.S. NAVY AND COMPARED TO NAVAL OFFICERS OF THE CIVIL ENGINEERING CORPS		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; March 1975 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Charles R. Fontz Michael P. Shoemaker		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE March 1975 13. NUMBER OF PAGES 69
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)* Naval Postgraduate School Monterey, California 93940		15. SECURITY CLASS. *(of this report)* Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Technology Transfer, Linker, Stabilizer, Cosmopoliteness, Innovation Methodology, t Test

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

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by

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MASTER OF SCIENCE IN MANAGEMENT

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ABSTRACT

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I. PREFACE

The recent surge in new knowledge has caused a so-called "technology gap." This gap exists because technology that exists at a scientific level is not always put to use at the practical level. Reasons for this phenomenon are many, but usually result because the potential user was unaware of the new innovation. The study of the transfer of technology from the source to the user has become more important as the technology gap has widened. Likewise, methods for reducing this gap, or at least understanding it, have grown in importance.

II. INTRODUCTION

The phenomenon of technology transfer, loosely defined as the process by which scientific and technical information moves from one context (individual, group, or organization) to utilization in another context, has been around as long as human beings have been able to communicate. Transfer of technology has encountered many problems primarily due to the accelerating rate of technological change and man's slowness to adopt this new technology. This has resulted in a general feeling that there is a gap between what science and technology can do and what science and technology is doing to overcome current socioeconomic problems in both developed and developing countries. "More and more in every area of public systems, the assertion is made that 'the technological solution exists' or can be readily made to exist, and the problem, therefore, is to overcome social obstacles to its diffusion." (Schon 1969:44)

It is probably a bit presumptuous to say that technology transfer is a more important phenomenon now than it was during the industrialization of the Western Countries and Japan. In fact, there is no real consensus that technology transfer is important. Some quite prominent people feel that new technologies have caused more problems than they have solved.

> After all, life in America was quite pleasant before we had automobiles, jet planes, and electrified homes. (Vice Admiral Hyman E. Rickover in a speech before the House Interior and Insular Affairs Committee as reported in the Sierra Club Bulletin, May 1972, p. 21)

While this kind of statement is overly negative, it is no more unrealistic than the view commonly held in the developing countries prior to the mid-1960's that science and technology was a panacea for socioeconomic ills. The late Jawaharlal Nehru, for example, claimed that science alone could solve the problems of poverty, hunger, illiteracy and despair. "The future" he stated, "belongs to science and those who make friends with science." (Morehouse 1968: xiii)

It is somewhat of a current myth that technology transfer was much more routine or easy in the past. The introduction of the Bessemer process for making steel took nine years to enter the United States, after it had been fully described and communicated throughout the world, and it took another eleven years before twelve firms in the United States were using the process[1] (Morison 1966: 145). The adoption of hybrid corn by United States farmers during the 1930's and 1940's took an average of over five years from the time an individual farmer first heard about the new corn to the time it was utilized by the farmer (Rogers 1962). And hybrid corn is one of the more recent and dramatic results of what is considered our most successful means for transferring technology--the agricultural extension service. In contrast, the State Technical Services (STS) program for small business, modeled after the agricultural extension services, lost federal funding in 1969 after only four years of operation. It seems that

---

[1]Andrew Carnegie, incidently, was the entrepereur who was the head of the twelfth firm to adopt the Bessemer process during this period.

technology transfer may not be a greater problem than in the past, but rather our impatience with the process has increased (Schon 1969).

While there is no reason to believe that the problem of technology transfer is greater now than in the past, it is certainly true that the nature of the phenomenon has changed drastically. Where once there was the individual inventor, there are now large Research and Development organizations within industries, universities, and government and even as separate private institutions. Likewise, the individual has been replaced, to a great extent by larger units as potential users of the products of Research and Development. Even in agriculture, functions of the farmer have been taken over by cooperatives (buying and marketing) and specialized firms (e.g., combining), or in many cases, corporations are replacing the individual farmers. In addition, technologies themselves have become more complex, and educational institutions have become more involved with training personnel to develop and use these technologies. Finally, there has been a growing government role in both supporting and carrying out Research and Development. In short, while technology transfer may not be more important now, it is clearly more complex, and in general no established organization or institution feels adequate to the challenge confronting it in dealing with rapid technological change.

Within the United States Navy, the "problem" of utilization of research results is also acute. It has been common practice to levy the blame for this "problem" on the middle

managers, specifically the Chief Petty Officers (Ratings E-7, E-8, and E-9). The Chief Petty Officers of the Naval Service are usually the scapegoats for any difficulties in the implementation of new policies or ideas. Perhaps this is due to their position in the chain of command structure. Whatever the cause, Chief Petty Officers are considered crucial for the successful transfer of new ideas and policies between the Officers and the Enlisted men. This study will examine this linking trait of Chief Petty Officers. It will do this by means of a previously devised questionnaire.

This questionnaire was administered to the Naval Officers of the Naval Facilities Engineering Command (Creighton, Jolly and Denning). A slightly modified version was given to the Government Service Employees of the Naval Facilities Engineering Command (Claassen). The sample group for this study is the Chief Radioman Rating of the United States Navy.

Both of the previous studies were compared in a study conducted by Professors Creighton and Jolly. The result of this analysis was that there was no difference in the two populations. From this analysis it can be stated that these sample groups were representative of all populations. In the same manner, it is assumed that Chief Petty Officers of the Navy are also representative of all populations, and therefore, as a group do not differ from previous study groups. In this manner, the hypothesis of this paper can be stated that Chief Petty Officers of the Radioman Rating of the Navy are not different in their tendency to adopt new research results from

people of other populations. This hypothesis will be studied by comparing the results of surveys administered to the Radioman Chiefs and to the Naval Officers of the Naval Facilities Engineering Command.

Concepts will be introduced to familiarize the reader with the elements of the technology transfer process and the justification for incorporation or deletion of questions within the questionnaire.

III. CONCEPTS

Havelock (1969), Rogers and Shoemaker (1971) and others have pointed out the centrality of the concept of linkage, or the quality of the state of cooperation and collaboration between interfacing groups, to technology transfer. There is nothing either very new or complicated about the concept of linkage. The intellectual origins of linkage can be traced to the writings of early or classical organization theorists who described the need for a division of labor in organizations and the need for the integration of the task units resulting from the division of labor in order to achieve the organization's purposes. The major difference between the earlier concept of integration and the current concept of linkage is that classical organization theorists tended to view people as passive instruments of organization. Integration, to the classical organization theorist, was a function of how well the authority structure, communications networks, and the like were formalized with the organization (Lawrence and Lorsch, p. 189).

The general conceptual model of the concept of linkage has been adapted from Creighton, Jolly, and Denning (p. 3) and is shown in Figure 1. It is a rather simplified view of the Linking Mechanism which does not show the complexities of interactions between individuals.

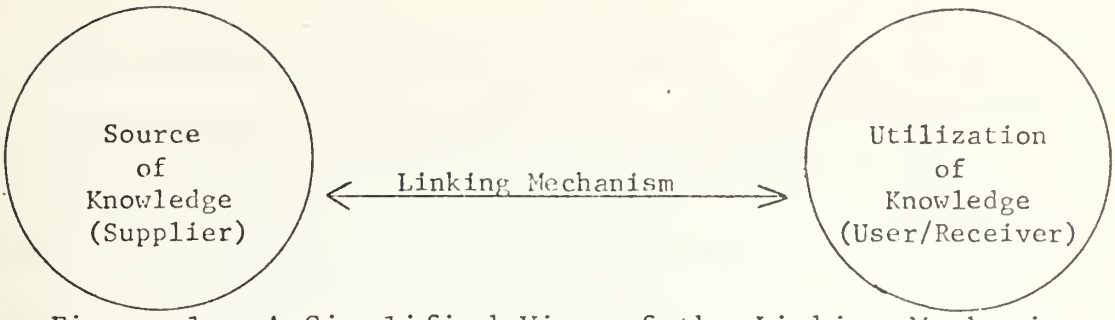

Figure 1. A Simplified View of the Linking Mechanism

The linker mechanism represents the interaction of people. The linker mechanism need not be independent, it may be incorporated in either the supplier or user environment (Creighton, Jolly, and Denning, p. 3).

"Technology transfer" as described by Creighton, Jolly, and Denning (p. 2), is "a purposive, conscious effort to move technical devices, materials, methods, and/or information from the point of discovery or development to new users." One of the behavioral factors identified in the Creighton, Jolly, and Denning model, described in Figure 2, is the linker. The linker refers specifically to the person to person aspect of technology transfer.

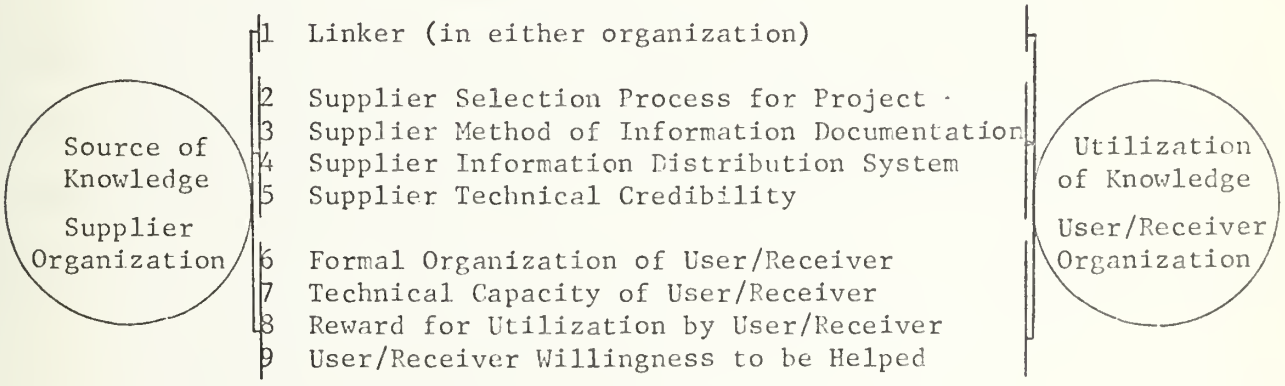
Source of Knowledge
Supplier Organization
1 Linker (in either organization)
2 Supplier Selection Process for Project
3 Supplier Method of Information Documentation
4 Supplier Information Distribution System
5 Supplier Technical Credibility
6 Formal Organization of User/Receiver
7 Technical Capacity of User/Receiver
8 Reward for Utilization by User/Receiver
9 User/Receiver Willingness to be Helped
Utilization of Knowledge
User/Receiver Organization

Figure 2. Knowledge Flow Enhancement Factors

Predictive Model of the Methodology of Technology Transfer from "A" Supplier Organization to "B" User Organization where Factors are Associated with Supplier or User. The one exception is the Linker Concept which has a unique relationship (Creighton and Jolly, p. 5).

The linker as described by Creighton, Jolly, and Denning is a person who is interested in new ideas and their implementation. These individuals usually possess characteristics that may be described as different from their colleagues. Linkers are described as innovative, willing to accept risk, active in multi-disciplines, have more information contacts, have a high credibility with peers, are cosmopolite, and are oriented toward outside information sources (Creighton and Jolly, p. 8).

The formal definition of the linker is "an individual who through his own initiative seeks out scientific knowledge, is an early knower of innovation, and acts as an intermediary between the source of knowledge and the individuals or organizations who put it to use" (Creighton and Jolly, p. 8).

It is important to recognize that although the term linker implies a third party between the source of knowledge and the user or knowledge, he need not be a part of an independent organization (See Figure 2). In fact, the linker may come from either organization but probably operates best if he is aligned more closely with the user organization as shown in Figure 3.

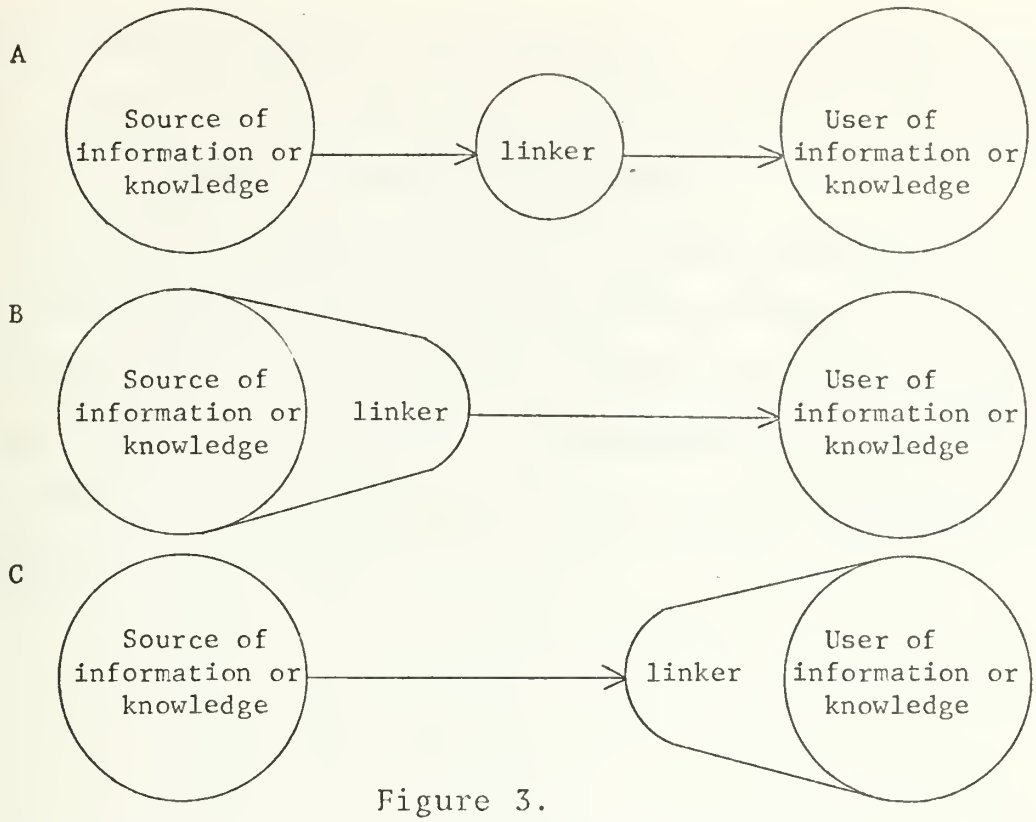

Figure 3.

The linker concept suggests a third party may be important in the transfer of information/knowledge from the source to the user. This linker, however, may be independent or may, in fact, be a member of either the Source or the User Organization (Creighton and Jolly, p. 6).

It has been established that Civil Engineering Corps Naval Officers with linker characteristics exist and can be identified by a simple questionnaire (Creighton, Jolly, and Denning, p. 72). Officers identified by the questionnaire as linkers were personally interviewed to validate the questionnaire and make sure that the characteristics which were sought by the test were exhibited by those persons having high linker scores. The linker characteristics in these individuals were quite apparent when tested orally, and it was hypothesized that it would be possible to identify the linker quality in another population, namely the Chief Petty Officers in the Radioman

rating, using a similar questionnaire. Accordingly, the test for the Civil Engineering Corps (CEC) Officers was slightly modified to apply to the Chief Radiomen.

It must be pointed out that no single question is believed to be an indicator which will identify a linker. It is not likely that any one person will exhibit all linker characteristics. The linker trait is a composite of characteristics and linkers tend to exhibit more of them than most other individuals.

IV. QUESTIONNAIRE

The Professional Preference Census for Radioman Chiefs was based primarily on the Professional Preference Census for Naval Officers as shown in Appendix D. A major source of information for the development of the questions was the Diffusion Documents Center at Michigan State University. Rogers and Shoemaker have analyzed approximately 1200 empirical reports and about 300 non-empirical reports from a variety of authors and disciplines (Creighton, Jolly, and Denning, p. 14). Revisions to the Naval Officers Census were made to orient the questions toward Chief Petty Officers. A summary of background information for each of the questions is given together with explanations for changes that were made. Complete source information for each of the original questions is given in Creighton, Jolly, and Denning. For direct comparison the two Censuses are found in Appendix C and Appendix D.

The first question of the Census for Radioman Chiefs is: "What is the highest rank to which you aspire." The question omitted "assuming that you were to make the Navy a career," since it was assumed that Chief Petty Officers for the most part are career oriented. The answers were changed to (a) Chief Petty Officer, (b) Senior Chief Petty Officer, (c) Master Chief Petty Officer, (d) Warrant Officer, (e) LDO (Limited Duty Officer). The basis for the question was that earlier adapters have higher aspirations than later adapters (Rogers and Shoemaker, p. 188).

Question two is: "Indicate the type of information upon which you would place the highest credibility." The question and the possible answers were taken exactly as they appeared in the Naval Officer questionnaire. The assumption was made that the Linker would be a good performer in terms of output. According to Creighton, Jolly, and Denning (p. 14-15) research indicates that better performing scientific and technical personnel tended to place most reliance on information which they have stored in their own minds and second on information stored in the minds of others. Formal written communication was given the least reliability. In addition, word of mouth was considered to be the most effective source of innovations. Since the characteristics of a good performer, innovator, and opinion leader are all assumed to be attributes of the Linker, question two was scored to give the most weight to responses choosing personal knowledge.

Question Three is: "Indicate which combination of words, when placed in the following sentence, would most accurately describe you: I feel that I hear about work-related developments _____ most of my colleagues." Possible answers ranged from "considerably before" to "sometime later." This question, along with its possible answers appeared exactly as it did in the Naval Officer questionnaire. Basis for this question came from Rogers and Shoemaker who generalized that earlier adopters have greater knowledge of innovations than later adopters (Creighton, Jolly, and Denning, p. 15).

Question four asks: "In the past year, how many non-routine, work-related projects have been completed for which

you supplied the original idea?" Both the question and the answers remained unchanged from one census to the other. The question was designed to measure the respondents innovativeness. It was hypothesized that the number of non-routine, work-related projects would give an indication of the person's willingness to investigate and implement new ideas. The question was based on the results of interviews conducted by Creighton, Jolly, and Denning (p. 16).

The fifth question is: "Indicate the number of formal work-related meetings and/or conventions which you attended last year and which involved personnel other than your immediate circle of colleagues." Two changes were made to question five. The first changed the original question from "technical and/or scientific society meetings" to "formal work-related meetings." The second change was to substitute "more than 6" for "more than the above" in the last answer. The changes both broadened the scope of the question and clarified the answer. Question five was designed to measure the degree of "cosmopoliteness" in the respondent. Rogers and Shoemaker define cosmopoliteness as "the degree to which an individual's orientation is external to a particular system" (Creighton, Jolly, and Denning, p. 17). From this definition Rogers and Shoemaker generalized the following:

(1) Earlier adopters are more cosmopolite than later adopters.

(2) Earlier knowers of innovations are more cosmopolite than later knowers.

(3) Opinion leaders are more cosmopolite than their followers.

Question six asks: "When you are on the job, do you most prefer work that is: (a) concerned with accomplishing a specific task, (b) concerned with attempting to solve a challenging but not specifically assigned task, (c) concerned with accomplishing those tasks for which I am individually responsible, (d) concerned with the efficient utilization of resources, (e) none of the above." The intent of the question was to measure "achievement motivation." Rogers and Shoemaker generalized that earlier adopters have higher levels of achievement motivation than later adopters. The characteristic of an early adopter, also assumed to be a characteristic of a Linker, was checked by measuring achievement motivation. Both the question and answers remained unchanged from the Naval Officer Census (Creighton, Jolly, and Denning, p. 18).

Question seven is: "In the past month, how many times have you sought further information about a new idea or ideas which you thought to be useful to your work?" This question is designed to determine the individual's natural desire to seek information. Rogers and Shoemaker reached the conclusion that earlier adopters seek information about innovations more than later adopters. This question was unchanged from the Naval Officer Census (Creighton, Jolly, and Denning, p. 19).

Question eight is a situational type question which was designed to check the respondents attitude toward borrowing (credit). Rogers and Shoemaker reasoned that earlier adopters

have a more favorable attitude toward credit (borrowing) than later adopters. This question was altered considerably to arrive at the correct interpretation (Creighton, Jolly, and Denning, pp. 19-20).

Question nine attempts to determine the individual's characteristics as an opinion leader. Question nine is: "Indicate the frequency with which your subordinates came to you in the past month for work-related information and/or advice which was not a function of your formal position." Rogers and Shoemaker and others concluded that earlier adopters have a higher degree of opinion leadership than later adopters. Other research indicates that one discriminating feature for an opinion leader or an innovator should be the person's relative frequency of reception and transmission of ideas. This question was unchanged from the Naval Officer Census (Creighton, Jolly, and Denning, p. 21).

Item ten asks the individual to indicate the total number of journals, magazines, and newspapers which he regularly reads. The question is the same as the one used in the Civil Engineering Corps Officers test. It was based on the following propositions:

(1) Earlier adopters have greater exposure to mass media communication channels than later adopters (Rogers and Shoemaker, p. 189).

(2) Earlier knowers of an innovation have more exposure to mass media channels of communication than late knowers (Rogers and Shoemaker, p. 108).

(3) Opinion leaders have greater exposure to mass media than their followers (Rogers and Shoemaker, p. 218). An innovator was found to be more likely to subscribe to a larger number of magazines than the general population (Engle, Blackwell, and Kegerries, p. 4). The supporting research indicated earlier adopters, early knowers (of innovations), opinion leaders, and innovators should all be distinguishable from the rest of the population by relative exposure to mass media. Question ten attempts to measure the trait.

The basis for question eleven was to measure "cosmopoliteness." Rogers and Shoemaker (p. 89) define cosmopoliteness as "the degree to which an individual's orientation is external to a particular system." The question asks the respondent to indicate the number of work-related organizations to which he holds membership. Since a dominant characteristic of a linker is his general orientation to things outside his own group, it was decided that membership in external societies, groups, etc. would be a viable indicator of cosmopoliteness. Research has shown (Rogers and Shoemaker, p. 189) that a linker is more likely to belong to special organizations because of his tendency to expand his interests and activities beyond the local environment. This question is slightly modified from the CEC Officers survey.

Question twelve asks the individual to indicate the level within the social strata to which he aspires 10 years from now. It was shown that linkers were more likely to set high goals for themselves and hence desire a higher social level

(Creighton, Jolly, and Denning, p. 43). This question was identical to the corresponding question on the CEC examination.

Question thirteen was a measure of the individual's venturesomeness. The respondent was placed in a role playing situation where he would have to indicate the level to which he would accept a new innovation. A decision must be made by the respondent to use a new item of electronic equipment immediately on a large scale, use the item immediately on a test basis, make a prototype, engage a consultant, or wait until the new equipment has proven effective through use by others. The assumption made was that the individual would project his attitudes toward innovations to this situation. This question was altered slightly from the CEC survey to make it more meaningful to Chief Radiomen.

Question fourteen asked the respondent to indicate the agency to which he relied most heavily as a source of information for work-related projects and/or problems. This question requires the individual to indicate which channel of information he feels is the most important. Linkers tend to value the interpersonal information channels to a greater degree than the non-personal channels, even though their exposure to both channels is greater than their counterparts (Creighton, Jolly, and Denning, p. 23). This question was only slightly altered from the CEC survey.

Question fifteen was: "Indicate the group of people to whom you primarily relate." This question is similar to

number eleven in that both are designed to measure cosmopoliteness. Linkers tend to be more cosmopolite than non-linkers (Creighton, Jolly, and Denning, p. 18). This question was identical to the corresponding question on the CEC survey.

Question sixteen asked the respondent to indicate the relative frequency with which he recommended a specific item of interest e.g., a journal article, research report, etc. to a colleague which dealt with a work-related topic. Linkers have a high degree of opinion leadership and would tend to recommend items of interest more readily than non-linkers (Creighton, Jolly, and Denning, p. 19). This question was identical to the corresponding question on the CEC survey.

Question seventeen was another role playing question. The respondent is put in a position where he must recommend a job to a friend. The job choices vary in risk from 20% chance for success to 100% chance for success, and the rewards offered increase as the risk of failure increases. The assumption was that the individual would project his own attitudes toward risk to the role playing situation. Linkers tend to assume risks more readily than non-linkers (Creighton, Jolly, and Denning, p. 27). This question was altered slightly from the CEC survey for clarity.

Question eighteen takes the direct approach and asks the respondent how he feels about accepting an innovative idea. The choice of answers ranged from "very eager to accept a new idea" to "prefer to use only proven ideas." Linkers tend to accept new ideas more readily than non-linkers. This question is identical to the corresponding question on the CEC survey.

V. METHODOLOGY

The questionnaire was sent to all Chief Radiomen, Senior Chief Radiomen and Master Chief Radioman, a total of approximately 2100 people. A master list was obtained from the Bureau of Naval Personnel. The list consisted of computer printed mailing labels. These detachable labels were then placed on envelopes containing return envelopes and the questionnaire (Appendix C).

The questionnaire as shown in Appendix C, consisted of nineteen questions directed toward identifying the characteristics of a Linker. A total of 1143 usable questionnaires were returned by the cutoff date of 21 February 1975. This represented 54.42% of the total mailed. Forty questionnaires were returned non-deliverable, 65 were returned incomplete or with missing data and another 105 were received after the cutoff date. This data is shown in Table IV.

TABLE IV

Questionnaire Returns

Number Mailed	2100	100%
Returned--non-deliverable	40	1.9%
Returned--incomplete	65	3%
Received after cutoff date	105	5%
Usable	1143	54.4%
Total Response	1353	64.3%

The questions were scored as indicated in Appendix C. Scoring was done to emphasize the particular Linker trait being tested. The range of scoring was from one to five with five indicating the strongest Linker trait. The scores for each subject were then totaled utilizing the Statistical Package for Social Sciences (SPSS). From this data a mean and standard deviation were determined for the total score. As was done with the Naval Officer Study, the separation points for the five Chief Radioman groups (Linker, Potential Linker, Middlemen, Potential Stabilizers and Stabilizers) were placed at .93 and 1.83 standard deviations from the mean score (Creighton, Jolly, and Denning, p. 41).

The results of this study are most easily summarized by studying Table I. Table I shows that the distribution of the population approximates normal. Those showing very strong Linker characteristics are shown on the right. The division line between potential linkers and linkers was selected at 1.83 standard deviations to the right of the mean.

Those individuals to the far left were called stabilizers and were identified as being 1.83 standard deviations to the left of the mean.

To allow comparison to the previous studies done in this area, Tables II and III are provided. Both Tables measure the same trait characteristics as Table I.

Although Linker's scores were high, the high scores do not indicate that a Linker is "better" than a person with a lower score. It simply indicates the existence of the qualities

that were being sought. It should be noted that Linker qualities do not necessarily exist in top management (Creighton, Jolly, and Denning, p. 47). The qualities normally occur in individuals at many levels in the organization. The groups were arbitrarily identified as: Linkers, Potential Linkers, Middlemen, Potential Stabilizers, and Stabilizers.

The first eighteen questions were used to identify Linkers and do the analysis on the Chief Radiomen. The last question consisted of four parts. Question nineteen dealt with the type of organization the person was working in, title and present rank, and years that the present and previous ranks have been held. The first eighteen questions were the only ones considered in the analysis of the data. However, in order to conduct a proper comparison between the Chief Radiomen and the Naval Officers, Questions 1, 6, and 8 were deleted as they were in the Naval Officer Survey. This resulted in a mean of 42.98 and a standard deviation of 6.223, and is compared to the two previous studies in Table V.

Tables I, II, and III portray the three studies in histogram form to give a visual means of comparison. The Government Service Employee Study (Claassen) is mentioned only as comparison for the total distribution of scores. The format and questions used was nearly identical to the Naval Officer Study.

Histogram showing the distribution of the individual scores after deletion of questions no. 1,6, and 8 for the Chief Radiomen.
Responding Population N = 1143 Mean = 42.980 Std. Dev. = 6.223

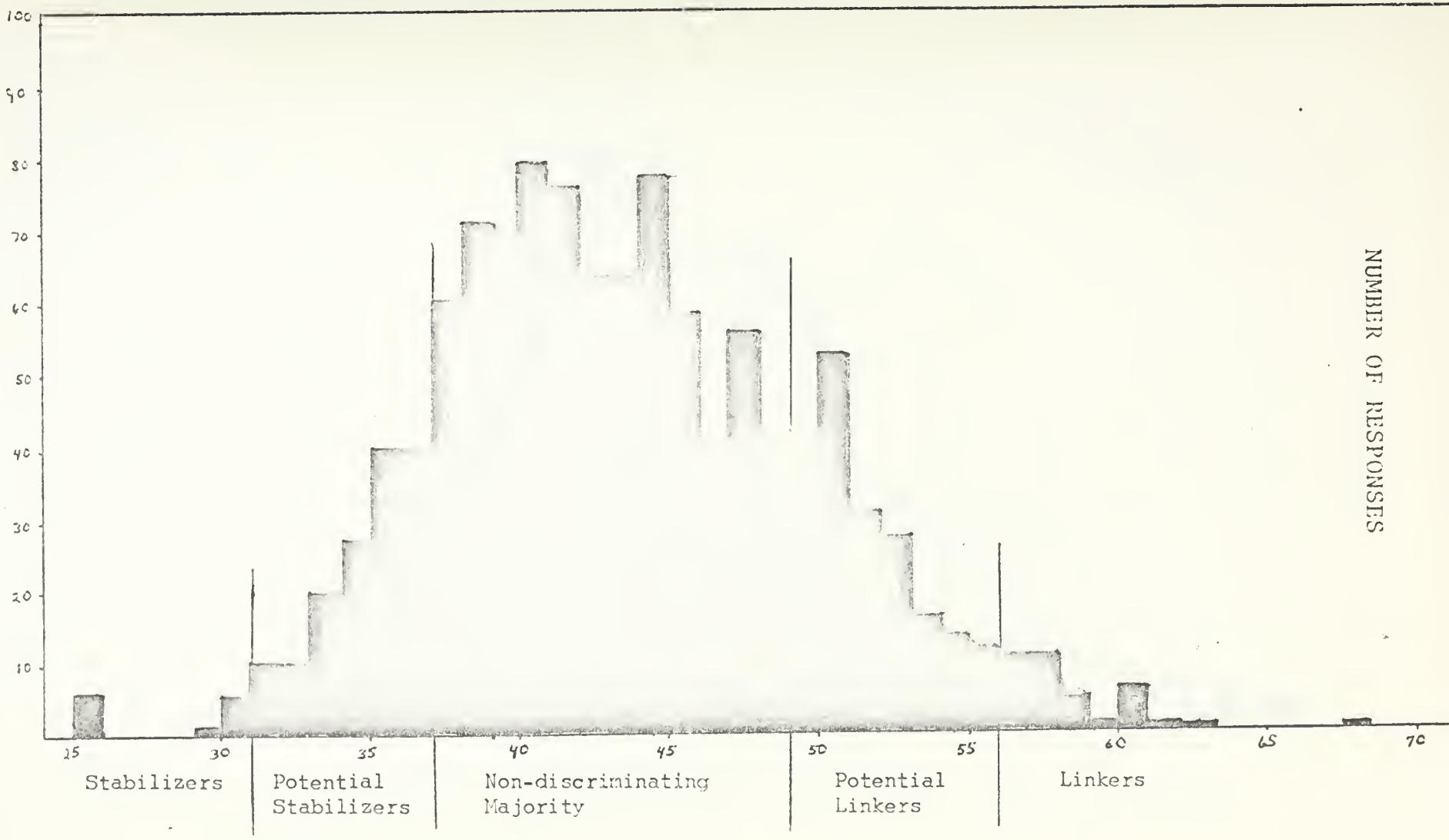

TABLE I

Histogram showing the distribution of the individual scores after deletion of questions no. 1,6, and 8 for the CEC Naval Officers.
Responding Population N = 1128 Mean = 43.518 Std. Dev. = 6.340

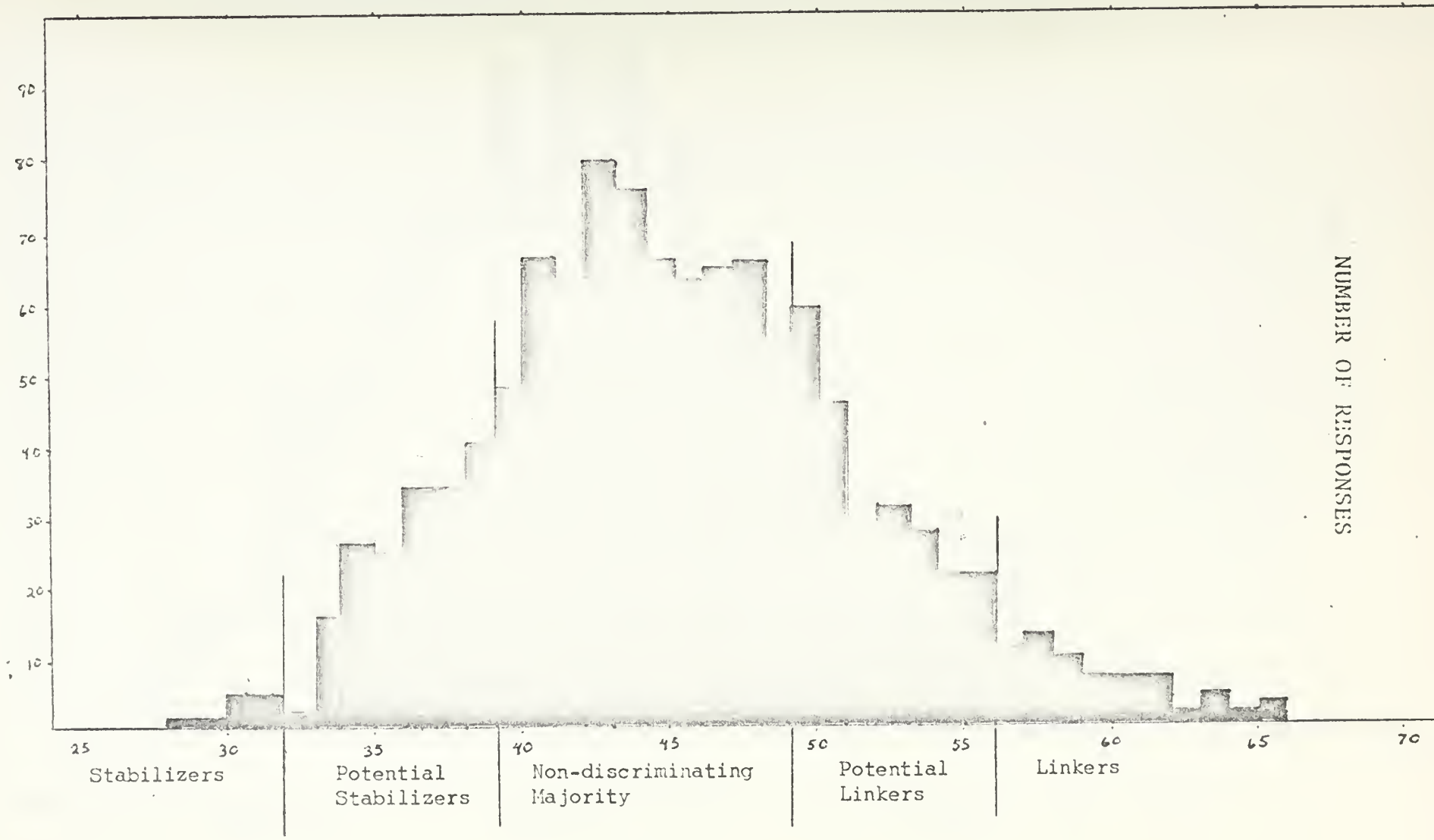

TABLE II

Histogram showing the distribution of the individual scores after deletion of questions no. 5,7, and 18 for Government Service Employees.
Responding Population N = 1598 Mean = 42.728 Std. Dev. = 7.742

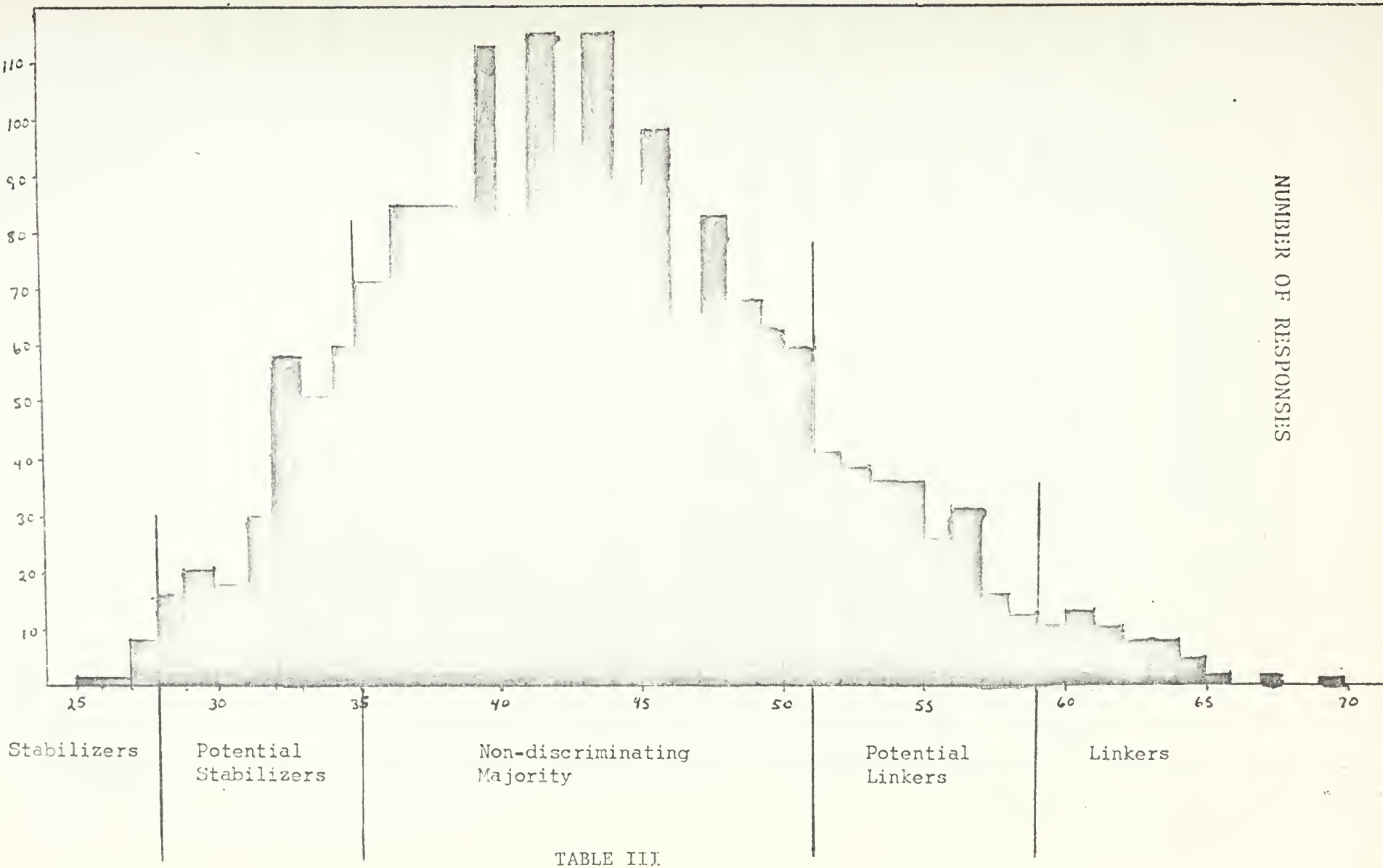

TABLE III

VI. COMPARATIVE ANALYSIS

A. STATISTICAL ANALYSIS

Since the sample sizes for both the Civil Engineering Corps (CEC) Officers and the Chief Radiomen exceeded 1000 and the distribution of total scores for both studies were normal, a two tailed t test was used at the .01 significance level to determine if the two groups could have come from the same population. Using a Z value of 2.576 it was determined that the difference between the two groups could occur by chance alone 1 time in 100, so the null hypothesis that these two samples are statistically different at the .01 significance level was rejected.

The two tailed t test is a "stronger" test than strict adherence to mathematical principles allows, since the data is not a result of a perfectly incremental measurement. An assumption was made that there are equal intervals between each value assigned as a score. A study by Baker, Hardyck, and Petrinovich indicates that for this type of study, this assumption is valid. The alternative would be to use a non-parametric test, but the results would have little meaning.

B. VALIDITY

The test given to the Chief Radiomen was nearly identical to the test administered to the CEC Officers and only slightly different from that given to the Government Service Employees (GS). Discriminant analysis showed that it was not possible

to distinguish between the two (CEC and GS) tests (Claassen, p. 38). The statistical analysis of the effectiveness of the measuring instrument, the Professional Preference Census, indicated a high degree of validity. The PPC was very effective in identifying those persons performing as "linkers" and those persons performing as "stabilizers." (Creighton, Jolly, and Denning, p. 50). Using this information, an assumption was made that the test administered to the Chief Radiomen was also valid.

The comparison of the scores of the three sample populations in terms of their linker-stabilizer behavior trait, gave the following results:

TABLE V

	Mean	Standard Deviation
Naval Officers	43.518	6.340
Radioman Chiefs	42.979	6.223
Government Service Employees	42.728	7.742

Histograms of the three populations have been given in Tables I, II, and III. In addition, individual histograms of each of the questions are shown in Appendix A.

A further comparison was obtained by summing only the percentages falling in the three highest response positions of each question. Creighton and Jolly followed this approach reasoning that the precise answer was not as important as the general magnitude of the answer. In other words, the trend is more important than the specific response on a continuum (Creighton and Jolly, p. 13).

This approach was followed and the sums of the top three percentages of the five possible responses to each question were determined.[2] These sums were then tested using the statistic Chi-square. The pairs of questions which gave a significant Chi-square at the 0.01 level are underlined and are used as the basis of the difference statements. This information is shown as Figure 4. Questions NAV002/RMC002, NAV014/RMC014, and NAV015/RMC015, do not have a response pattern that can be considered a continuum. In their case only specific responses could be compared.

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[2]The percentages associated with the answer to response 3, 4, and 5 were added together to give the aggregate score. See Appendix B.

	NAV SUM	RMC SUM	CHI-SQUARE
NAV003/RMC003 Hears about new work related developments sooner.	79.9	84.2	.23
NAV004/RMC004 Three or more non routine work related ideas per month.	58.2	52	.66
NAV005/RMC005 Attend three or more professional meetings per year.	27.6	50	18.18
NAV007/RMC007 Sought further information 3 or more times in last month.	57.3	46.4	2.07
NAV009/RMC009 Subordinates or peers came to you for information 8 or more times in month.	35.1	44.5	2.52
NAV010/RMC010 Regularly read 5 or more journals, magazines or newspapers.	60.9	61.0	.0002
NAV011/RMC011 Hold membership in 3 or more work related organizations.	19.4	8.6	6.01
NAV012/RMC012 Social aspiration upper-middle class or above.	94.4	87	.58
NAV013/RMC013 Medium risk or above in use of work related new products.	90.9	95	.18
NAV016/RMC016 Recommended to colleagues 3 or more new ways during last month	36.7	36.5	.001
NAV017/RMC017 Accept medium or higher risk when involving risk and security.	71.7	67.6	.23
NAV018/RMC018 Cautious to eager to adopt new ideas.	96.7	93.9	.08

Figure 4.

Summation of Three Top Responses to Questions

Shown on the previous page is a tabulation of the sum of the percentages falling in the three highest responses to a question for questions whose answers are a continuum. The value of the Chi-square is given. The 0.01 significance for Chi-square is 6.63, 1 D.F. Those questions exceeding this value are underlined. The Radioman Chiefs are compared to the Naval Officers, i.e. the Naval Officer response was selected as the expected value.

These question pairs, associated answer values, and Chi-square statistics are shown in Figure 5.

The results presented in Figures 4 and 5 can be generalized under two headings, "Characteristics that are Similar" and "Characteristics that are Different."

C. CHARACTERISTICS THAT ARE SIMILAR

It may be postulated that Naval Officers of the Civil Engineering Corps and Chief Radiomen might have some traits in common. An explanation for this might lie in similarities in training between the two groups. Certainly the environment could play a part in forming behavior patterns.

For many of the questions the analysis tabulated in Figures 4 and 5 indicated that the responses could have come from the same population. These questions are listed here in detail in order to support the general hypothesis that: in general, Chief Petty Officers of the Radioman Rating in the U. S. Navy are no different in terms of technology transfer than other populations.

Thirteen of the fifteen questions support the above stated hypothesis. They are:

NAV002/RMC002

The type of information upon which the respondent placed the highest credibility on the Naval Officer Census was first,

personal knowledge and second, experimentation. This differed slightly in the Chief Radioman Census which had experimentation first and personal knowledge second.

NAV003/RMC003

The feelings as to the time when the respondent learns about new work-related developments is "about the same time" or "sooner than" for both population samples.

	NAV VALUE	RMC VALUE	CHI-SQUARE
NAV002/RMC002 Placed highest credibility on personal knowledge.	46.1	38.1	1.39
NAV002/RMC002 Placed second highest credibility on experimentation.	29.8	41.7	4.75
NAV014/RMC014 Depends on literature as information source.	53.6	37.7	4.71
NAV014/RMC014 Depends on personal experience as information source.	7.6	37.4	116.8
NAV015/RMC015 Mutual work-related interest with people doing similar work.	14.7	10.8	1.03
NAV015/RMC015 Mutual work-related interest with fellow workers.	51.7	41.8	1.89

Figure 5.

A Comparison of Selected Responses Only

For questions that were not a continuum, in the simplest sense, selected discrete answers were compared. The value of the Chi-square is given (.01 = 6.63, 1 degree of freedom).

NAV004/RMC004

The responses from the separate populations are similar in percentages of persons supplying three or more work-related project ideas.

NAV007/RMC007

The estimated number of times that a respondent felt that he sought further information in the last month, of a non-routine nature about his work, was similar for both population samples and was centered around 3 or more times.

NAV009/RMC009

The number of times that subordinates, peers, and/or superiors sought further information through direct contact was similar for both population samples and was most often reported as being greater than 7 times in the past month.

NAV010/RMC010

The number of journals, magazines, and newspapers which are regularly read by the respondents was most often reported as five or more for both populations.

NAV011/RMC011

The distribution of the membership pattern of work-related organizations, for those holding memberships in three or more professional organizations, was similar for both groups.

NAV012/RMC012

The distribution of responses for both samples were peaked about the upper middle class.

NAV013/RMC013

The willingness to accept risk involving the use of a new product in the work situation ranged from medium to high for both population samples.

NAV015/RMC015

Both the CEC Naval Officers and the Chief Radiomen centered their mutual work-related interests with their fellow

workers, with the rest of the distribution very similar as well.

NAV016/RMC016

The number of recommendations to colleagues of new ways to do things during the past month was reported to be mostly one or two by both population samples. The distribution of responses to this question was similar for both samples.

NAV017/RMC017

The willingness to accept risk by both population samples was very similar for the entire range of responses with the majority indicating the medium to high risk responses.

NAV018/RMC018

The majority of both population samples perceived that their feelings about adopting a new idea was most often described as "discrete use of" to "very eager."

The responses to these thirteen questions support the argument that in general the two populations are very similar and both groups could possibly have come from the same population.

D. CHARACTERISTICS THAT ARE DIFFERENT

Certain areas of investigation of perceived behavior were found to be quite different between the two population samples. These question response differences are important and produce an insight about the expected behavior of the different populations.

Two of the fifteen questions had responses which differed between the two populations. They were:

NAV005/RMC005

Naval Officers tended to attend fewer professional meetings and/or conventions per year, than Radiomen Chiefs.

NAV014/RMC014

The two discrete responses measured in Figure 5, show that the characteristic of the two populations to rely on literature as an information source was very similar, but the second characteristic of relying on personal experience as an information source was very different.

The differences to question five are not readily explained. Naval Officers and Chief Petty Officers tend to move around considerably, therefore, it would be expected that the Radioman Chiefs responses to question five would be very similar to the Naval Officers. However, in an effort to clarify the question, the phrase "formal work related meetings" was substituted for "technical and/or scientific society meetings." The response to this question was almost identical to the response to question four of the Government Service Employee's Survey (Creighton, Jolly, p. 33). These questions were identical and tend to lend credence to the idea that both the Government Service Employees and the Radioman Chiefs interpreted the question in the same manner. If question five of the Naval Officer Survey had been less restrictive, it is likely that their responses would have been similar.

As a logical explanation for question fourteen, it would appear that Chief Petty Officers tend to rely more on personal experience than Naval Officers due largely to their differences in background. Most of the Chiefs have "learned by doing,"

and it would be natural to expect this type of response. With regards to the similarities to the characteristic of relying on literature as an information source, it should be pointed out that many times in the course of their work Chief Petty Officers are required to consult reference manuals or publications on how to perform a specific function. This response would also be expected when considering the highly technical aspects of the Radioman Rating.

It appears that the measurable differences in the Linker-Stabilizer response between the Radioman Chiefs and the Naval Officers are reasonable as well as predictable. Although an in depth analysis of the differences has been made, it has been found that these differences are minor and do not affect the hypothesis that 'in general, Chief Petty Officers of the Radioman Rating in the U. S. Navy are no different in terms of technology transfer than other populations.'

VII. CONCLUSIONS

A self administered questionnaire was given to the entire population of E-7, E-8, and E-9 Chief Radiomen in the U.S. Navy. The purpose of the test was to measure the Linker-Stabilizer quality of the individuals. The questionnaire was as close as possible to the test designed by Creighton, Jolly, and Denning and given to the Civil Engineering Corps (CEC) Officers. The validity of the test had been determined in previous studies.

Only minor differences between the two populations could be determined. Linkers appeared in both groups at about the same relative frequency. At the .01 significance level, no statistical difference could be determined between the distributions of the two populations.

One implication of this study is that if an organization is attempting to implement a new idea, program, or system, then it probably is not worthwhile to single out any general population as more or less likely to accept the new idea. Instead, since linkers can be determined by testing, linkers should be identified and the innovation should be presented to them first.

A further implication is that the people who have been blaming many of the problems of the Navy on the senior enlisted personnel may be wrong. There appears to be similar percentages of linkers and stabilizers in all general populations which have previously been studied, and a safe

generalization would be that they exist at about the same frequency in all populations.

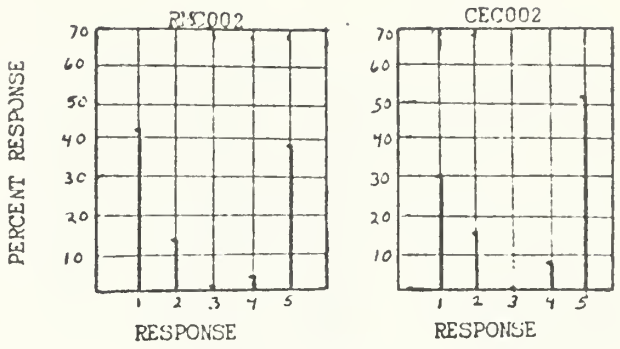
APPENDIX A

This Appendix shows histograms of the percentage of responses to each question in the surveys. Each question in the Radioman Chief survey (RMC) is paired with the corresponding question from the survey of the Civil Engineer Corps Officers (CEC) to allow a comparison to be made. The number of samples from the CEC survey was 1128, and the number of RMC samples was 1143.

Data for questions CEC001, CEC006, and CEC008 was not readily available, so these questions were deleted and no comparison was made.

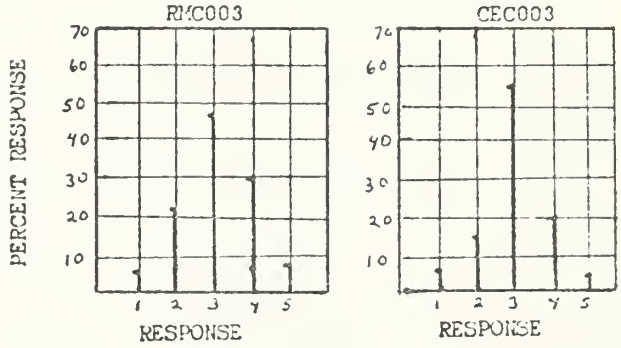
The type of information upon which you would place highest credibility.

5. personal knowledge
4. associated staff
3. vendors
2. literature
1. experimentation



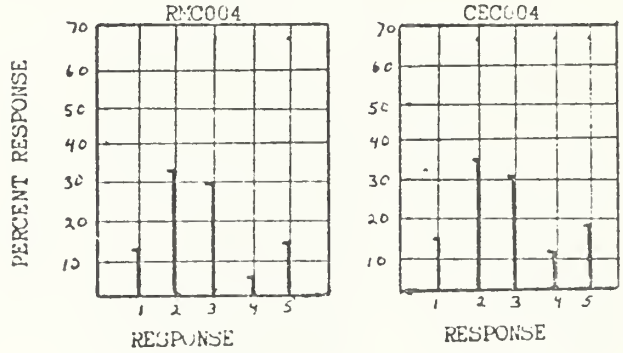
I feel that I hear about new work related developments _____ most of my colleagues.

5. considerably before
4. sooner than
3. at at about the same time as
2. later than
1. sometime later than



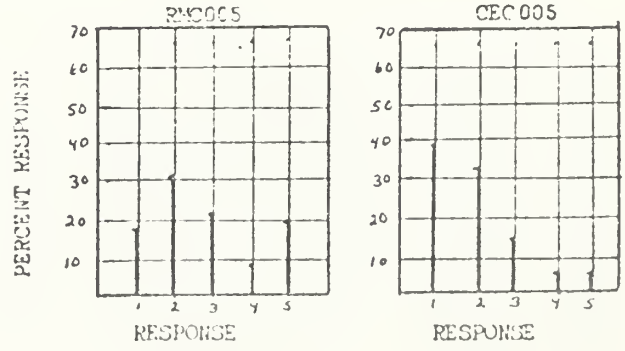
Number of non-routine, work-related projects completed for which you supplied the original idea.

5. more than 6
4. 5-6
3. 3-4
2. 1-2
1. 0



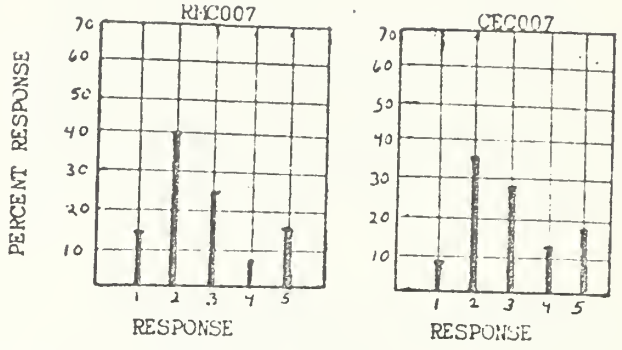
Number of formal work-related meetings or conventions which you attended last year which involved personnel other than your immediate circle of colleagues.

5. more than 6
4. 5-6
3. 3-4
2. 1-2
1. 0



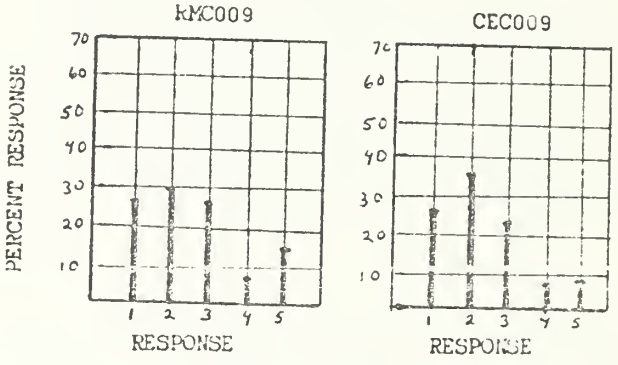
Number of times you sought further info in the last month--non routine about your work.

5. more than 6
4. 5 to 6
3. 3 to 4
2. 1 to 2
1. none



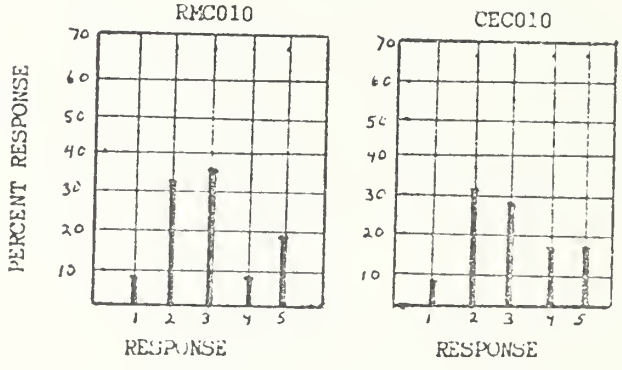
Frequency that subordinates, peers and/or superiors came to you during past month for advice--not a function of your formal job.

5. more than 15
4. 11 to 15
3. 8 to 10
2. 4 to 7
1. 0 to 3



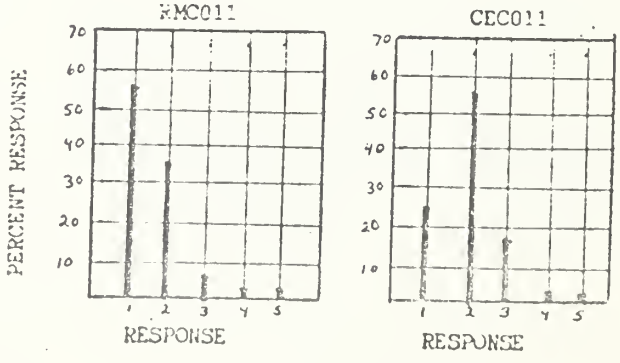
The number of journals, magazines, and newspapers which you regularly read.

5. more than 8
4. 7 to 8
3. 5 to 6
2. 3 to 4
1. 0 to 2



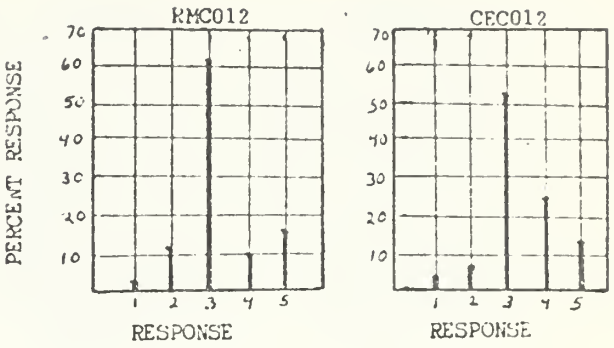
The number of work-related organizations to which you hold current membership.

5. more than 6
4. 5 to 6
3. 3 to 4
2. 1 to 2
1. none



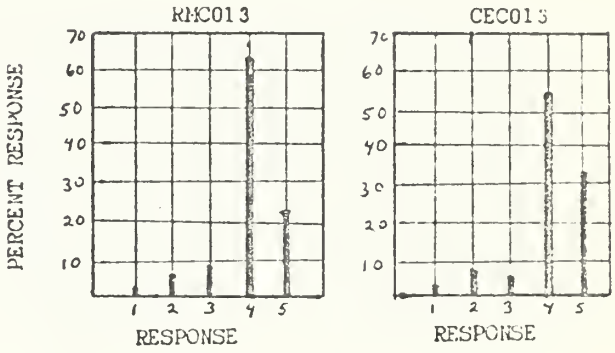
Social aspiration within next 10 years.

5. upper
4. lower-upper
3. upper-middle
2. middle
1. lower-middle



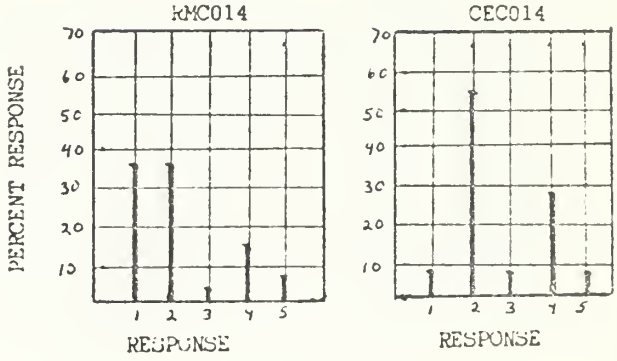
Measure of risk involving work and use of a new product.

5. highest risk
4. high risk
3. medium risk
2. low risk
1. no risk



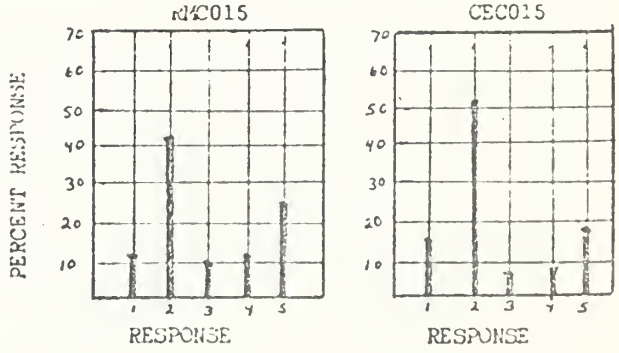
Information sources for work-related projects and/or problems.

5. external sources
4. colleagues
3. sales representatives
2. literature
1. personal experience



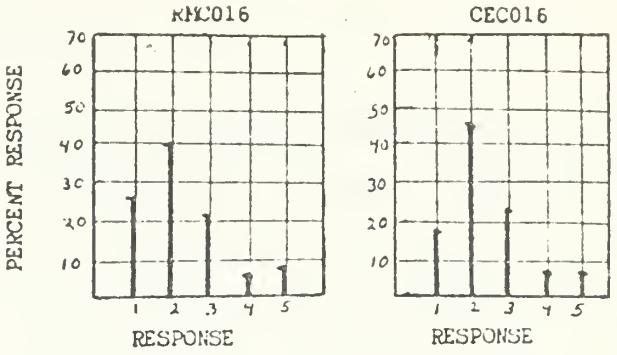
With whom do you have mutual work-related interests?

5. many groups-geographically dispersed
4. several groups in your locale
3. community associates
2. people doing similar work
1. fellow workers



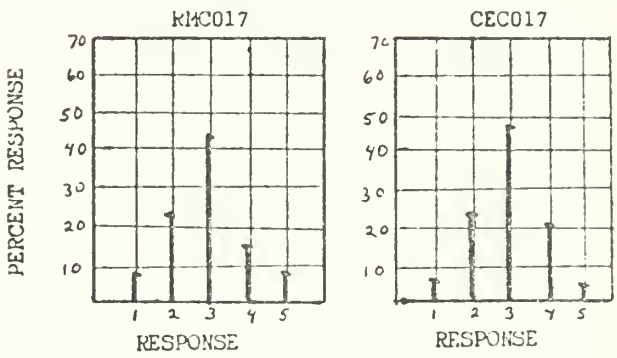
Recommendations to colleagues of new ways to do things during past month.

5. more than 6
4. 5 to 6
3. 3 to 4
2. 1 to 2
1. none



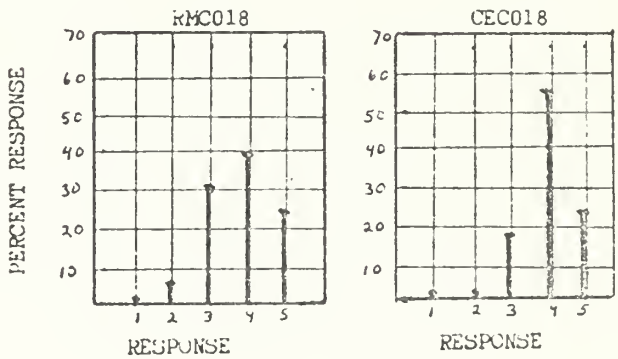
Measure of risk involving work and security.

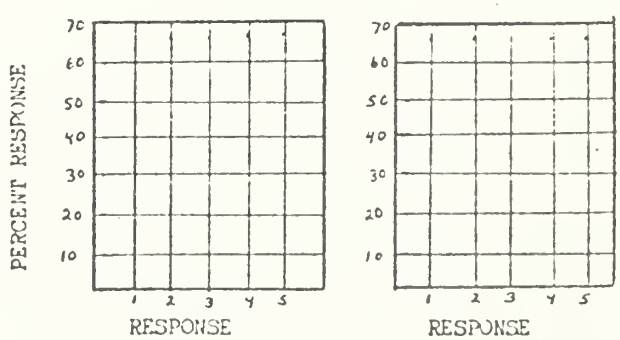
5. highest risk
4. high risk
3. medium risk
2. low risk
1. no risk



Feelings about a new idea.

5. eager to adopt
4. discrete use of
3. cautious
2. skeptical
1. use proven only





APPENDIX B

Appendix B is a tabulation of question response percentages and the sum of the percentages of the 3, 4, and 5 responses.

This table allows numerical comparison of the percentages of responses to each question. It also allows numerical comparison of percentage of responses that may indicate linkers or potential linkers, namely the sums of the 3, 4, and 5 responses.

RESPONSE

Pair		1	2	3	4	5	SUM 3+4+5
1	RMC002	41.7	14.4	1.7	3.9	38.1	43.7
	CEC002	29.8	16.4	0.3	7.4	46.1	53.8
2	RMC003	5.0	10.7	47.2	29.7	7.3	84.2
	CEC003	4.0	16.1	56.4	19.9	3.6	77.9
3	RMC004	13.8	34.1	30.6	6.8	14.6	52.0
	CEC004	15.4	26.4	26.1	12.2	19.9	58.2
4	RMC005	18.2	31.8	21.6	8.2	20.2	50.0
	CEC005	39.3	33.0	15.7	6.3	5.6	27.6
5	RMC007	13.3	40.3	24.3	5.9	16.5	46.4
	CEC007	8.8	34.0	28.4	12.0	16.9	57.3
6	RMC009	25.3	30.3	25.4	4.5	14.6	44.5
	CEC009	27.7	37.3	21.0	5.8	8.3	35.1
7	RMC010	6.6	32.4	34.1	8.7	18.2	61.0
	CEC010	7.9	30.9	29.4	16.0	15.5	60.9
8	RMC011	55.7	35.6	6.7	1.2	0.7	8.6
	CEC011	26.3	54.2	17.1	1.9	0.4	19.4
9	RMC012	1.2	11.7	60.5	10.2	16.3	87.0
	CEC012	0.5	5.1	52.5	26.2	15.7	94.4
10	RMC013	0.3	4.8	9.3	62.5	23.2	95.0
	CEC013	0.3	8.6	5.8	54.5	30.6	90.9

Pair		1	2	3	4	5	SUM 3+4+5
11	RMC014	37.4	37.7	2.1	15.6	7.2	24.9
	CEC014	7.6	53.6	4.7	27.8	6.0	38.5
12	RMC015	10.8	41.8	9.9	12.0	25.5	47.4
	CEC015	14.7	51.7	5.7	8.7	18.8	33.2
13	RMC016	24.0	39.5	21.8	5.9	8.8	36.5
	CEC016	18.9	44.4	22.9	6.7	7.1	36.7
14	RMC017	9.2	23.2	43.1	15.6	8.9	67.6
	CEC017	3.2	23.9	47.2	20.5	4.0	71.7
15	RMC018	0.5	5.6	30.7	39.1	24.1	93.9
	CEC018	0.4	1.8	17.0	56.3	23.4	96.7

APPENDIX C

Shown is a copy of the instrument used to identify the Linker-Stabilizer characteristics of the Radioman Chief Petty Officers. Following the instrument is shown the scoring arrangement.

PROFESSIONAL PREFERENCE CENSUS

1. What is the highest rank to which you aspire?

   a) Chief Petty Officer
   b) Senior Chief Petty Officer
   c) Master Chief Petty Officer
   d) Warrant Officer
   e) LDO

2. Indicate the type of information upon which you would place the highest credibility.

   a) Personal knowledge
   b) Associated staff
   c) Vendors and/or trade councils
   d) Literature-journals, books, etc.
   e) Analysis and experimentation

3. Indicate which combination of words, when placed in the following sentence, would most accurately describe you: I feel that I hear about new work-related developments in my professional area_____most of my colleagues.

   a) considerably before
   b) sooner than
   c) at about the same time as
   d) later than
   e) sometime after

4. In the past year, how many non-routine, work-related projects have been completed for which you supplied the original idea?

   a) 0
   b) 1-2
   c) 3-4
   d) 5-6
   e) more than 6

5. Indicate the number of formal work-related meetings and/or conventions which you attended last year which involved personnel other than your immediate circle of colleagues.

   a) 0
   b) 1-2
   c) 3-4
   d) 5-6
   e) more than 6

6. When you are on the job, do you most prefer work that is:

a) concerned with accomplishing a specific task
b) concerned with attempting to solve a challenging but not specifically assigned task
c) concerned with accomplishing those tasks for which I am individually responsible
d) concerned with the efficient utilization or resources
e) none of the above

7. In the past month, how many times have you sought further information about a new idea or ideas which you thought to be useful to your work?

a) 0
b) 1-2
c) 3-4
d) 5-6
e) more than 6

8. For the past 2 years a fellow chief has had a strong desire to take his family on a vacation in a foreign country. The trip will cost about $2,000. He can take leave anytime in the next year and could save $2,000 or more in a year. What would you advise him to do?

a) charge the entire trip on credit
b) save for 3 months with the balance credit
c) save for 6 months with the balance credit
d) save for 9 months with the balance credit
e) save for 1 year and pay cash for the entire trip

9. Indicate the frequency with which your subordinates came to you in the past month for work-related information and/or advice which was not a function or your formal position.

a) 1-3
b) 4-9
c) 10-15
d) 16-20
e) more than 20

10. Indicate the total number of journals, magazines, and newspapers which you regularly read:

a) 1-2
b) 3-4
c) 5-6
d) 7-8
e) more than 8

11. Indicate the number of work-related organizations to which you hold current membership.

a) 0
b) 1-2
c) 3-4
d) 5-6
e) more than the above

12. Indicate the level within the social strata to which you would aspire to be 10 years from now.

a) upper
b) lower-upper
c) upper-middle
d) middle
e) lower-middle

13. Mr. C., a radio technician, who is employed by a medium sized electronics firm recently learned of a new piece of radio equipment used extensively in Europe but never adopted in the United States. The piece of equipment appears to have several advantages in terms of substantial cost reduction, superior performance qualities, and relative ease of construction and installation as compared to its counter part in the United States.

After a thorough investigation, Mr. C. obtained extensive and reliable information on the characteristics, costs, and advantages of the new piece of equipment. Further, his company could easily obtain exclusive manufacturing rights for use in the United States.

Imagine that you are Mr. C. Indicate which of the following would best describe your approach to the new piece of equipment.

a) Recommend that the new piece of equipment be utilized in the firm's next major building project so as to take advantage of the substantial cost savings.
b) Recommend that the piece of equipment be used in one of the firm's small local building projects so as to test its acceptance.
c) Recommend that the firm construct a non-commercial prototype.
d) Recommend that the firm engage the services of an independent consultant.
e) Recommend that the firm wait until the piece of equipment has received considerable commercial application in the United States.

14. Which of the following do you tend to rely upon most heavily as a source of information for work-related projects and/or problems.

a) Literature
b) Sales representatives
c) Personal experience
d) Colleagues
e) Sources external to your organization

15. Indicate the group of people to whom you primarily relate.

a) Other Chief Petty Officers in your specialized field.
b) Work-related colleagues (both military and civilian).
c) Community associates.
d) I have a primary reference group, but it is people other than those listed above.
e) I do not have a primary reference group.

16. During the last month, indicate the relative frequency with which you recommended a specific item of interest, e.g., a journal article, research report, or a lead to either, to a colleague which dealt with a work-related topic.

a) 0
b) 1-2
c) 3-4
d) 5-6
e) More than the above

17. One of your close friends is retiring and is looking for a job as a civilian. Some of the companies he has contacted are new and although their future success is uncertain, they offer potential salaries above that which he is now receiving. Indicate which company you would advise your friend to join.

	CHANCES FOR COMPANY SUCCESS	PROSPECTIVE SALARY INCREASE
a)	2 in 10	200%
b)	4 in 10	100%
c)	6 in 10	50%
d)	8 in 10	25%
e)	Survival Guaranteed	0%

18. Indicate which of the following best characterizes your approach to an innovative idea:

a) Very eager to adopt new ideas.
b) Discreet use of new ideas.
c) Deliberate for sometime before adopting a new idea.
d) Skeptical and cautious about adopting a new idea.
e) Prefer to only use proven ideas.

19. Biographical data

a) Please indicate the type of organization you are working in at this time. _____

_____

b) Please indicate the title of your billet and present rank. _____

c) How many years have you held your present rank? _____

d) How many years did you hold your previous rank? _____

Scoring for Radioman Chief Petty Officer
Professional Preference Census:

Question	Number of Points				
	a	b	c	d	e
1	1	2	3	4	5
2	5	4	3	2	1
3	5	4	3	2	1
4	1	2	3	4	5
5	1	2	3	4	5
6	2	5	3	4	1
7	1	2	3	4	5
8	5	4	3	2	1
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	5	4	3	2	1
13	5	4	3	2	1
14	2	3	1	4	5
15	1	2	3	4	5
16	1	2	3	4	5
17	5	4	3	2	1
18	5	4	3	2	1

APPENDIX D

Shown is a copy of the instrument used to identify the Linker-Stabilizer characteristics of the Civil Engineering Corps Naval Officers. Following the instrument is shown the scoring arrangement.

NAVAL OFFICER

PROFESSIONAL PREFERENCE CENSUS

1. Assuming that you were to make the Navy a career, what would be the highest rank to which you would aspire?

   a) Lieutenant Commander
   b) Commander
   c) Captain
   d) Rear Admiral
   e) Admiral

2. Indicate the type of information upon which you would place highest credibility.

   a) Personal knowledge
   b) Associated staff
   c) Vendors and/or trade councils
   d) Literature-journals, books, etc.
   e) Analysis and experimentation

3. Indicate which word, when placed in the following sentence, would most accurately describe you: I feel that I hear about new work-related developments in my professional area _____

   a) considerably before
   b) sooner than
   c) at about the same time
   d) later than
   e) sometime after

4. In the past year, how many non-routine, work-related projects have been completed for which you supplied the original idea?

   a) 0
   b) 1-2
   c) 3-4
   d) 5-6
   e) More than the above

5. Indicate the number of technical and/or scientific society meetings and/or conventions which you attended last year which involved personnel other than your immediate circle of colleagues.

   a) 0
   b) 1-2
   c) 3-4
   d) 5-6
   e) More than the above

6. When you are on the job, do you most prefer work that is:

   a) concerned with accomplishing a specific task
   b) concerned with attempting to solve a challenging but not specifically assigned task

c) concerned with accomplishing those tasks for which I am individually responsible
d) concerned with the efficient utilization of resources
e) none of the above

7. In the past month, how many times have you sought further information about a new idea or ideas which you thought to be useful to your work?

a) 0
b) 1-2
c) 3-4
d) 5-6
e) More than the above

8. Mr. E., a civil engineer, who is married and has three children recently decided to perform some major improvements upon his house (cost approximately $1,000). Mr. E. realized that the improvements were not urgently required but would make life at home more comfortable for the E. family. Consequently, Mr. E. was faced with a decision as to how he should finance the home improvements because such seemed to be the sole determinant as to when the E's could utilize these improvements. Indicate which of the following financial decisions you would advise Mr. E., to make for his home improvements.

a) Borrow the necessary money immediately at 18% annual interest.
b) Save for 6 months and borrow the remainder at 10% annual interest.
c) Save for one year and borrow the remaining at 7% annual interest.
d) Save for two years and pay cash for the improvements if present interest rates remain the same.
e) Make no improvements.

9. Indicate the frequency with which your subordinates, peers, and/or superiors came to you in the past month for work-related information and/or advice which was not a function of your formal position.

a) 1-3
b) 4-9
c) 10-15
d) 16-20
e) More than the above

10. Indicate the total number of journals, magazines, and newspapers which you regularly read:

a) 1-2
b) 3-4
c) 5-6
d) 6-8
e) More than the above

11. Indicate the number of technical, scientific, and/or professional societies to which you hold current membership.

a) 0
b) 1-2
c) 3-4
d) 5-6
e) More than the above

12. Indicate the level within the social strata to which you would aspire to be 10 years from now.

a) Upper
b) Lower-Upper
c) Upper-Middle
d) Middle
e) Lower-Middle

13. Mr. C., a civil engineer, who is employed by a medium sized construction firm recently learned of a new building material which is used extensively in Europe but never adopted in the United States. The building material appears to have several advantages in terms of substantial cost reduction, superior insulation qualities, and relative ease of construction as compared to its counter part in the United States.

After a thorough investigation, Mr. C. obtained extensive and reliable information on the characteristics, costs, and advantages of the new material. Further, his company could easily obtain exclusive manufacturing rights for use in the United States.

Imagine that you are Mr. C. Indicate which of the following would best describe your approach to the building material.

a) Recommend that the new idea be utilized in the firm's next major building project so as to take advantage of the substantial cost savings.
b) Recommend that the building material be used in one of the firm's small, local building projects so as to test its acceptance.
c) Recommend that the firm construct a non-commercial prototype.
d) Recommend that the firm engage the services of an independent consultant firm so as to verify the information obtained and to test market acceptance.
e) Recommend that the firm wait until the building material has received considerable commercial application in the United States.

14. In your experience, which of the following do you tend to rely most heavily upon as a source of technical information for work-related projects and/or problems?

a) Literature-books, government manuals, and professional trade and technical journals.
b) Vendors-representatives of, or documentation generated by suppliers or potential suppliers.
c) Personal experience-ideas which were previously used by yourself in similar situations and recalled directly from memory.
d) Staff-selected members of your staff who are not assigned directly to the project being considered.
e) External sources-sources which do not fall into any of the above categories.

15. Indicate the group of people to whom you primarily relate.

a) Officers within your specialized field.
b) Work-related colleagues (both military and civilian).
c) Community associates.
d) I have a primary reference group but it is people other than those listed above.
e) I do not have a primary reference group.

16. During the last month, indicate the relative frequency with which you recommended a specific item of interest, e.g., journal article, research report, or a lead to either to a colleague which dealt with a work-related topic.

a) 0
b) 1-2
c) 3-4
d) 5-6
e) More than the above

17. Mr. A., a middle management executive, who is married and has one child, has been working for a corporation since graduation from college five years ago. He is assured of a lifetime job with a modest, though adequate, salary, and liberal pension benefits upon retirement. On the other hand, it is very unlikely that his salary will increase much before he retires. While attending a convention, Mr. A. is offered a job with a small, newly founded company which has a highly uncertain future. The new job would pay more to start and would offer the possibility of a share in the ownership if the company survived the competition of the larger firms.

Imagine that you are advising Mr. A. Listed below are several probabilities or odds of the new company's proving financially sound.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. A. to take the new job.

a) The chances are 1 in 10 that the company will prove financially sound.
b) The chances are 3 in 10 that the company will prove financially sound.
c) The chances are 5 in 10 that the company will prove financially sound.
d) The chances are 7 in 10 that the company will prove financially sound.
e) The chances are 9 in 10 that the company will prove financially sound.

18. Indicate which of the following best characterizes your approach to an innovative idea:

a) Very eager to adopt new ideas
b) Discreet use of new ideas
c) Deliberate for sometime before adopting a new idea
d) Skeptical and cautious about adopting a new idea
e) Prefer to only use proven ideas

19. Biographical data.

a) Please indicate the type of organization you are working in at the time. _____

_____

b) Please indicate the title of your billet and present rank. _____
c) How many years have you held your present rank? _____
d) How many years did you hold your previous rank? _____

Scoring for Naval Officer Professional Preference Census:

Question	Number of Points				
	a	b	c	d	e
1	1	2	3	4	5
2	5	4	3	2	1
3	5	4	3	2	1
4	1	2	3	4	5
5	1	2	3	4	5
6	2	5	3	4	1
7	1	2	3	4	5
8	5	4	3	2	1
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	5	4	3	2	1
13	5	4	3	2	1
14	2	3	1	4	5
15	1	2	3	4	5
16	1	2	3	4	5
17	5	4	3	2	1
18	5	4	3	2	1

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